

Patent Claims

1. An electrical machine having
 - a rotor which is mounted such that it can rotate,
 - 5 - an associated, stationary stator, and
 - a device for cooling at least the stator or parts of it,characterized in that the cooling device has at least one cold surface (14) of a refrigeration unit, to which
10 the parts of the stator (5, 25) to be cooled are thermally coupled via a line system (10, 20), in which a circulation of a coolant (k) is provided or is carried out on the basis of a thermosiphon effect.
- 15 2. The machine as claimed in claim 1, characterized in that the cold surface (14) is arranged on or in a condenser area (8, 28), which is integrated in the line system (10, 20, 35).
- 20 3. The machine as claimed in claim 1 or 2, characterized in that at least one coolant area (7) is integrated in the line system (10), in which stator parts (5i) to be cooled make a large-area thermally conductive connection with the coolant (k).
- 25 4. The machine as claimed in claim 3, characterized in that the coolant area is the internal area (33) of a stator housing (32) in which at least the majority of the stator parts (34) to be cooled are arranged.
- 30 5. The machine as claimed in one or more of the preceding claims, characterized in that the stator parts to be cooled comprise a stator winding (34) and/or laminates (5i) of a laminated core (5).

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6. The machine as claimed in one or more of the preceding claims, characterized in that the stator (25, 31) has cooling channels (27, 36), which are integrated in the line system (20, 35).

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7. The machine as claimed in one or more of the preceding claims, characterized by a heating apparatus (38) on the line system (35) in an area (37) in which the coolant (k) is at least largely in the liquid state (k_f).

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8. The machine as claimed in claim 7, characterized in that the heating apparatus (38) on or in the line system (35) is located at least in an end-face area (37) of the stator (31).

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9. The machine as claimed in claim 7 or 8, characterized by the heating power of the heating apparatus (38) being controlled by means of a pressure sensor.

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10. The machine as claimed in one or more of the preceding claims, characterized in that the cooling device additionally has flow paths for air cooling (L_f).

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1. An electrical machine having
 - a rotor which is mounted such that it can rotate,
 - 5 - an associated, stationary stator, and
 - a device for cooling at least the stator or parts of it,characterized in that the cooling device has at least one cold surface (14) of a refrigeration unit, to which
10 the parts of the stator (5, 25) to be cooled are thermally coupled via a close line system (10, 20), which has discrete coolant areas (7, 27) in the area of the stator parts (5i) to be cooled, and in which a circulation of a coolant (k) is provided or is carried
15 out on the basis of a thermosiphon effect, with the coolant (k) being heated or at least partially vaporized in the area of the stator parts (5i) to be cooled.

- 20 2. The machine as claimed in claim 1, characterized in that the cold surface (14) is arranged on or in a condenser area (8, 28), which is integrated in the line system (10, 20).

- 25 3. The machine as claimed in claim 1 or 2, characterized in that the coolant areas (7) are thermally conductively connected over a large area to the stator parts (5i) to be cooled.

- 30 4. The machine as claimed in claim 3, characterized in that the coolant areas (7) are formed between laminates (5i) of a laminated core (5) of the stator.

5. The machine as claimed in claim 1 or 2, characterized in
35 that the coolant areas are in the form of cooling channels (27).

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6. The machine as claimed in one of the preceding claims, characterized in that the cooling device additionally has flow paths for air cooling (Lf).